

JCS/ACB (REDS)

Iowa Electric Light and Power Company

October 9, 1992
NG-92-4387

JOHN F. FRANZ, JR.
VICE PRESIDENT, NUCLEAR

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, DC 20555

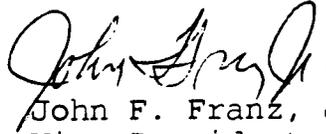
Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Reply to a Notice of Violation
Transmitted with Inspection Report 92017
File: A-105, A-102

Dear Dr. Murley:

This letter and attachment are provided in response to the Notice of Violation concerning activities at the Duane Arnold Energy Center.

If you have any questions regarding this response, please feel free to contact my office.

Very truly yours,



John F. Franz, Jr.
Vice President, Nuclear

JFF/CJR/pjv~

Attachment: Reply to a Notice of Violation Transmitted with
Inspection Report 92017

cc: C. Rushworth
L. Liu
L. Root
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IOWA ELECTRIC LIGHT AND POWER COMPANY
REPLY TO A NOTICE OF VIOLATION
TRANSMITTED WITH INSPECTION REPORT 92017

VIOLATION

10 CFR 50, Appendix B, Criterion III, Design Control, states in part "...measures shall also be established for the selection and review for suitability of application of material, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components."

Contrary to the above, the licensee failed to thoroughly evaluate for suitability the upgraded ASEA Brown Boveri K800S breakers for the existing K225 breaker cubicles (1B09 and 1B20) during Design Change Package (DCP) 1468, subsequently resulting in a breaker fire and river water pump inoperability.

This is a Severity Level IV violation (Supplement I).

RESPONSE TO VIOLATION

1. Reason for the Violation

In June 1992, new River Water Supply (RWS) pump breakers were being installed under DCP 1468. The existing ITE K225 breakers were being replaced with 480 VAC ASEA Brown Boveri (ABB) K800S breakers with solid state trip units. This was being done to simplify calibration and improve breaker coordination. Following installation of the new breakers, two of the four RWS pumps ("B" and "D") experienced trips when started. Troubleshooting identified problems with the "B" pump breaker magnetic latch assembly. Action was taken to reinstall the old breaker on the "B" pump. Troubleshooting on the "D" breaker did not identify any problems. On June 17, 1992, the "D" RWS pump was being started in order to verify operability following the breaker troubleshooting when the pump tripped and a small fire erupted at the pump breaker cubicle in the Intake Structure.

Initial followup showed that the "D" breaker failure and fire were caused by poor contact between the breaker disconnect assembly fingers and the breaker cubicle bus bar stabs. The primary disconnect assembly fingers on the new K800S breaker have approximately a 3/8 inch gap while the old K225 breakers have a 1/8 inch gap. The breaker cubicle stabs which fit into the disconnect assembly fingers are approximately 1/4 inch

thick. As a result, the breaker disconnect assemblies on the new solid state breakers were physically larger than those on the old mechanical breakers and were not compatible with the old bus bar stabs in the breaker cubicle. This poor fit between the disconnect assembly fingers and the bus bar stabs led to arcing and the resultant fire.

Immediately following discovery of the improperly sized breaker assemblies, a multi-disciplinary task force was established to determine the root cause of this event and to recommend corrective actions to preclude recurrence. This task force concluded that the root cause was a lack of thorough in-house review of interface design specifications. Specifically, electrical/mechanical interfaces between the K800S breakers and the existing breaker cubicles were not reviewed to ensure compatibility. Instead, during the design process, a telephone call was made to ABB to determine whether K800S breakers would fit into the existing cubicles. ABB stated that the breakers would fit with no modifications required. The memo prepared concerning this telephone conversation was used as the primary basis for concluding that it was acceptable to use a K800S breaker. Although the design verification process had questioned the use of a K800S breaker in place of a K225 breaker, verification of the interchangeability of the two breakers was based on the telephone conversation and not technical documentation.

In addition, the 1990 Material Request (MR) written to buy the K800S circuit breakers was contradictory in that it called for like-for-like replacements yet specified K800S circuit breakers. This is inconsistent since a K800S breaker is not a direct replacement for a K225 breaker. This discrepancy was not identified during the procurement process for this modification. The breaker received with the above wording in the purchase order was the K800S model number specified.

The root cause analysis also identified a weakness during installation of the breakers. The interference keys on the K800S breakers were relocated to allow the breakers to fit into the RWS load center cubicles. It was believed that the vendor had mispositioned the keys. A formal documented process was not used in authorizing relocation of the interference keys.

2. The Corrective Steps That Have Been Taken and the Results Achieved

After the "D" breaker incompatibility was discovered, the remaining RWS pump breakers were inspected; a similar condition was found to exist for all four RWS pump breakers. The "C" pump breaker was changed out within five minutes utilizing the old K225 mechanical trip breaker that had been removed. The "A" pump breaker was also changed out shortly thereafter, resulting in full operability of the "A" loop of the River Water System.

Damage to the "B" Loop breaker cubicle was then assessed. The "B" cubicle was cleaned to remove smoke damage. An old style mechanical trip breaker assembly was reinstalled in the "B" cubicle, and the "B" pump was satisfactorily tested. This action was completed on June 19, 1992. Repairs to the "D" cubicle were subsequently completed September 7, 1992 after the necessary parts had been obtained.

As a result of the root cause analysis findings, the following additional corrective actions have been taken. An earlier design modification on 480v essential load centers 1B03 and 1B04 had upgraded existing K600 breakers to K800S breakers. A review was initiated to determine if those K800S breakers could be susceptible to the same problem as the RWS breakers. This review determined that the primary disconnects on the K800S breakers are the same size as those on K600 breakers and are therefore not susceptible to the problem encountered when the K225 breakers were replaced with K800S breakers.

We subsequently identified other design modification packages which could have been susceptible to similar problems. These packages were reviewed to ensure the adequacy of the electrical and mechanical interfaces as well as plug-in connections which were not witnessed or tested. No further discrepancies were identified.

Applicable Engineering Department modification procedures were reviewed and revised to ensure modification packages contain detailed documentation, such as drawings and specifications, which demonstrate that new equipment interfaces are compatible with existing plant equipment interfaces. These procedures were also reviewed and revised as appropriate to provide guidance on the documentation of vendor

communications during the design process.

In addition, we have issued guidance to appropriate personnel re-emphasizing that equipment/materials can be altered for fit during the construction of a modification beyond that specified in the design only if a formal revision process is used. The appropriate construction procedures have been reviewed and clarified as necessary to provide guidance on the review of vendor documents, correspondence, and direction during modification installation.

3. The Corrective Steps That Will be Taken to Avoid Further Violations

As committed in LER 92-010, additional actions that will be taken to avoid further violations are the following:

The current DCP procurement process will be reviewed in light of the RWS breaker purchase in 1990 to determine if enhancements should be made. This review and a finalized course of action to prevent recurrence will be completed by December 1, 1992.

A brief description of the lessons learned from this event has been disseminated to plant personnel. As a followup action, a formal presentation of the lessons learned from this event will be incorporated into fourth quarter continuing training for technical staff. Additional material on circuit breakers will be incorporated into appropriate engineering and maintenance training programs. This training will also be implemented during the fourth quarter of 1992.

4. The Date When Full Compliance Will Be Achieved

Full compliance was achieved with the evaluation of suitability of the K800S breakers and the repair of the "D" River Water Supply pump breaker cubicle on September 7, 1992.